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of 1847, Leichhardt fell a prey to his praiseworthy attempt to traverse the continent from Moreton Bay to Swan River. His loss originated then a series of expeditions, among which that of Mr. Gregory deserves a most prominent place and notice from the range of scientific knowledge which it furnishes of the Australian continent. For although his expedition did not lead to the discovery of Leichhardt's traces, his different journeys from the north-east and south-east, performed towards the centre, girdle as it were the mysterious and impenetrable region of the interior of Australia, and facilitate thus the solution of that geographical problem. Considering then the services rendered to science by Mr. Gregory, this Society cannot but join cordially in the thanks to that distinguished explorer which are proposed to him from the chair.

The third Paper read was :—

3. *Exploration of the Murchison, Lyons, and Gascoyne Rivers in Western Australia.* By Mr. F. T. GREGORY.

Communicated by the COLONIAL OFFICE.

Perth, July 26, 1858.

SIR,—In accordance with the instructions conveyed in your letter of the 15th March, authorising me to take the command of the Expedition to Shark Bay, in course of organization by the northern settlers, I have the honour to furnish the following report of our proceedings while on that service, for the information of his Excellency the Governor.

The preliminary arrangements having been completed, and the heavy portion of the stores forwarded by sea to Champion Bay, I left Perth on the 26th of March, accompanied by Mr. James Roe as second in command, chainer Fairburn having started the previous day with the team and light equipment of the expedition.

Proceeding by way of Toodyay to the Irwin River, the party were joined by Mr. W. Moore, with three horses; passing on by way of Champion Bay, we arrived at Koobijawanna, the point of general rendezvous, by the 10th of April. On the 12th the remainder of the stores arrived from Champion Bay, the party being augmented to six persons by the addition of Mr. C. Nairne and Dugel, an aboriginal policeman. This day and the following were occupied in weighing and packing stores, shoeing horses, &c.

14th April.—The equipment of the expedition being completed (with the exception of one horse to be procured at the Geraldine Mine), we moved on to Yanganooka, passing the Geraldine Mine on the 16th, and bivouacked on the Murchison River, 6 miles above the mine, having obtained the additional horse, making in all six saddle and six pack-horses; our supplies consisting of 60 days' rations, on a scale of $1\frac{1}{2}$ lbs. of flour, 8 ozs. of pork, 4 ozs. of sugar, and $\frac{1}{2}$ an

oz. of tea per diem, the party being all well armed and furnished with ammunition.

The mean of our observations with the aneroid barometer gives 575 feet for the elevation of this part of the river above the sea.

17th to 25th April was occupied in ascending the Murchison River by easy stages to the junction of the Impey, the highest point attained by me last year. The only observations worthy of remark were, that the inundation had not been so great as that which occurred the previous summer, the grass up to this point not being by any means so abundant as I had found it on my former visit; the volume of water now running in the bed of the river being, however, at this time about the same, although none of the tributaries, including the Roderick and Impey, had been in flood, little or no rain having fallen to the W. of the 117th degree of longitude, except to the N. of latitude 26°.

I availed myself of the opportunity afforded to make several additions and corrections to the map of this part of the country, verifying the correction made by me last year in the latitude of Mount Murchison and adjacent hills. By an improved series of triangulation and a carefully observed set of lunar distances, I am inclined to place Mount Murchison in about longitude 116° 30' E., which makes it more nearly approximate to the longitude formerly given by Mr. Austin.

The variation of the compass I found by several amplitudes to be 2° 30' W. The bed of the Murchison River is here about 1077 feet above the sea. In addition to the fish and game formerly observed on this part of the river, we met with large flocks of the gallinule, which have for so many years excited the curiosity of the colonists as to their habitat; from subsequent observations it is evident they come from much farther to the north-eastward. But one party of natives had as yet been seen, consisting of eight or ten, who chased our native Dugel to the camp while out shooting, but it was difficult to ascertain whether with hostile intentions. From this time to our return we regularly mounted sentry during the night, and no one was allowed to quit the party any distance alone, a precautionary measure, the necessity of which was fully borne out by the sequel.

26th April.—From our camp, which was situated about 8 miles west of Mount Murchison, we fairly commenced the exploration of unknown country. Following the river nearly N.N.E. for 14 miles, it turned abruptly to the east; we, however, held our course, which, at 4 miles farther, brought us to the foot of Mount Narryer, which we ascended, and procured a valuable round of angles from

its summit. This hill has an altitude of 1688 feet above the sea, and is formed by the eruption of a coarse dark-coloured crystalline trap through a base of amorphous sandstone, the direction of the range of which it forms a part being nearly north and south. Skirting round the north end of this range we struck east over a stony plain, thinly grassed, amongst open wattles, and at 5 miles again came upon the Murchison some time after dark. The pools here were somewhat larger than for many miles below, being from 60 to 80 yards wide and $\frac{1}{2}$ a mile in length, the water in them becoming decidedly brackish; samphire, atriplex, and other saluginous plants being abundant on the banks.

27th April.—We only advanced 9 miles, owing to Mr. Moore and Dugel having to return for one of the water-breakers, which had been torn off the pack-saddle the previous night in a thicket. Towards our bivouac, which was in latitude $26^{\circ} 23' 38''$, the country near the river improved much, the channel of the river becoming very shallow; the water had spread over the flats for more than $\frac{1}{2}$ a mile on either side, large flooded gum trees growing abundantly, with a fine sward of grass beneath, the soil being a rich brown clay loam. Gallinule and cockatoos were in large flocks feeding on the grass seeds, which were now nearly ripe.

28th April.—To latitude $28^{\circ} 07'$ the river continued to come from north by east through an extensive plain, bounded on the west by a low range of trap and granite hills, at an average distance of 6 or 7 miles, while to the eastward only a few distant peaks were visible, flooded gum growing plentifully for more than a mile back from the river, on flats of tolerably good pasture. Receding somewhat farther from the river the country opens out into extensive plains, yielding but little grass; atriplex bush and thinly scattered stunted acacia and melaleuca trees forming almost the entire vegetation.

29th April.—A few miles nearly north brought us to where a considerable tributary joins the Murchison from the north, the river trending first north-east, then east, and finally, towards the afternoon, it came from the southward of east, our bivouac being only 7 miles north of the previous night, while we had made nearly 18 miles of easting. The bed of the river had gradually become more rocky as we ascended; gneiss, with quartz dykes, passing through it and yielding a large quantity of salt, rendered the running water of the river scarcely drinkable: the only fresh water was found in the back channels filled by the late inundations. The ranges which ran parallel with the river to the westward terminated some miles to the north of the bend. Another range apparently granitic and broken up into detached peaks, commencing a little to the eastward

of its termination, runs east for about 20 miles at the distance of 6 or 7 miles from the north bank of the river.

To the eastward an elevated range, with two conspicuous summits which were respectively named Mount Matthew and Mount Hale, terminated the view in that direction, while to the south only a few detached peaks were visible.

To-day we first observed a very beautiful convolvulus, which we afterwards found to bear roots like a sweet potato, some of them more than a pound weight and well flavoured, forming a very important article of food to the natives. The flowers are numerous, and measure from 2 to 3 inches in diameter, their outer edges of a dark lilac, deepening to a rich purple at the centre, with a pale-green convolute ribbing on the outside, the stem and leaf of the plant resembling the canidia. Mr. Drummond, to whom I have described it, considers it an important discovery, as by cultivation it might become a valuable addition to our Australian esculents.

A small species of rock-melon was also found in great abundance, about the size of a pigeon's egg, somewhat bitter to the taste, but they were not ripe; in other respects it much resembles the cultivated varieties.

The bed of the river at this night's bivouac had attained an elevation of 1240 feet above the sea.

30th April.—Finding that the Murchison was leading us too much to the eastward, the object of the expedition being to reach the Gascoyne with as little delay as possible, we quitted the river on a N.N.E. course for about 8 miles over a tolerably grassy plain, in some parts open, with atriplex and samphire, and in others rather thickly studded with acacia and melaleuca. Ascending a granite hill of 150 feet elevation, the plain was observed to the eastward to extend to the horizon, only broken by one remarkable bold trap hill at the distance of 20 miles, which was eventually named Mount Gould, the main Murchison flowing round its southern base, while a considerable tributary from the north-east passed close under it to the north-west. To the north of our position the country rose into a succession of stony ridges thinly grassed and nearly destitute of trees; in the valleys the kangaroo grass was tolerably plentiful and quite green, a sufficient evidence that we had now arrived within the influence of the rains that had produced the recent inundation, which gave us every hope of being able to push across the country intervening between this and the Gascoyne. We accordingly altered our course to north-west for the remainder of this and the following day, crossing several tributaries to the Murchison, in which we found plenty of water, and on their banks an abundant

supply of grass for our horses; the streams being generally divided from each other by low stony ridges or plains of red sandy loam, yielding a rather scanty supply of grass.

3rd May.—Having rested the party the previous day, it being Sunday, in latitude $25^{\circ} 33' 48''$, at a fine pool of fresh water in a stream running south, and apparently tributary to the Murchison, we resumed our course for 3 or 4 miles up a branch of the stream upon which we had been encamped, which terminated at a gentle stony ascent; another mile brought us to its summit, which proved to be the water-line between the Gascoyne and Murchison; its elevation was found to be 1500 feet above the sea. From this ridge a short descent northward led us to the head of a water-course, which we followed in the same direction for 17 miles, augmented by several small tributaries; turning to the westward it formed a junction with another river coming from the eastward, in latitude $25^{\circ} 14' 23''$, at an elevation of 1144 feet above the sea.

The country through which we had passed was a nearly level and barren plain, evenly and closely paved with small stones, among which a few stunted acacia found a precarious existence; to this portion of country we gave the characteristic name of Mac-Adam Plains.

4th May.—The river we had encamped upon the preceding night had a level sandy channel 35 yards wide, with several shallow pools in its bed; a narrow belt of flooded gum lined either bank, which also produced abundance of excellent feed; several of the grasses were new to us, yielding a large quantity of seed; farther back the pasture was more scanty, and of an inferior variety of grass, the trees consisting almost entirely of small hakea or acacia.

The features of the country are generally very tame, with the exception of a prominent hill of considerable altitude nearly 20 miles to the northward, to which we gave the name of Mount Gascoyne. The summit of another range of less elevation, a little to the northward of west, distant 15 miles, was called Mount Puckford.

Having decided upon following the left bank of the river, with the view of ascertaining what tributaries might join it from the southward, we, this morning, took our course for Mount Puckford, touching frequently upon the bends of the river, which soon formed a junction with a large channel coming from the eastward, which ultimately proved to be the main Gascoyne; it was still running in a small stream in the bottom of a sandy bed 80 yards wide, traces of recent heavy floods being plentiful. At 10 miles the river has broken through a ridge of ancient opaque white lava, lying north-

east and south-west, and a few miles farther, coming in contact with the south-east foot of Mount Puckford, it doubles back round its north-east base, and there takes a general north-west course to latitude $24^{\circ} 36'$ and longitude 116° E., which we reached by noon of the 7th, a considerable tributary joining at this point from the northward. A compact sandstone range resting on a granite base (which was named the Lockier Range, after Mr. Lockier Burges, one of the principal promoters of the expedition) here diverts the course of the river to the left, which, by sundown, we found was running nearly south. The country, for the last 50 miles, varies but little in character; extensive open plains alternating with low granite ridges, the banks of the river, which here has acquired a width of 100 yards, with a depth of 40 feet, being, in many places, stony and cut down by deep muddy creeks, rendering travelling both slow and laborious. Several tributaries join from the north and south, all of which had very recently ceased to run.

To the north and east were several prominent peaks and ranges of trap hills clothed with short herbage; to the highest of the former, a single conical peak, with deeply serrated sides, was given the name of Mount James, after my friend and fellow traveller Mr. James Roe; while two lofty summits, far to the northward, were called Mount Samuel and Mount Phillips.

The principal feed was found near the banks of the rivers, the back country still yielding only a scanty supply of a red coloured silky grass of little value except when quite fresh. A tree resembling the sycamore of the Murchison, but with the leaves arranged in triplets, and the seed-pods in the form of a large bean, grows near the river, and attains a diameter of 2 feet, with a height of 40 feet; the wood is light and spongy, something resembling the *Nuytsia floribunda*, but not gummy. It is formed by the natives into shields, and near the coast into canoes. We also found on some of the rocky hills a tree with fruit and flowers, resembling a small fig, the leaves like a lemon, but yielding an acrid milky juice.

Several new species of crested quail and dark brown pigeons were first observed here; the beautiful small doves, common in the northern districts, were also seen by thousands; Gallinule and the elegant *Geophaps plumifera* (crested pigeon of the marshes) were also very numerous.

8th May.—Pursuing our course down the left bank, we crossed several stream beds which drain a large tract of country between this and the Murchison. The Gascoyne here divides into several broad sandy channels, sometimes as much as a mile apart. Towards evening we came upon a native encampment: few of the men appeared

to have returned from their day's hunting, but we observed upwards of 30 women and children, who ran into the bed of the river to hide, some of the women immersing their children completely under water occasionally to prevent their cry of alarm attracting our attention. Although we had before met with and spoken to several natives, this was the first opportunity we had of examining into their domestic economy. Around their fires, of which there were many, were ranged a number of wooden scoops capable of holding from 2 to 4 quarts; these contained a variety of seeds and roots; the most plentiful was a species of grain like small plump drake gathered from a grass much resembling wheat, which is very abundant on the alluvial flats, and a root resembling an onion, not larger than a pistol bullet, a few rats, which are very numerous in the grassy flats, and a small variety of samphire like a Hottentot fig, formed the principal portion of their evening repast.

The few weapons left by the men consisted of heavy spears, with from 3 to 18 barbs cut out of the solid wood, the shaft from 10 to 12 feet in length; large shields resembling those in use by the natives at Champion Bay, made from the sycamore, and a few skins of the red kangaroo, formed their entire camp equipment.

Leaving everything as we found it, we passed on about 2 miles and encamped for the night on a low sandy island in the bed of the river, which was here full of flooded gums of large growth, there being just sufficient grass for our horses immediately around our fire. By 9 o'clock our supper had been disposed of, and I had just completed my observations for latitude, when we heard the shouts of a large party of natives approaching from the direction of their camp; leaving Mr. Roe with two others to guard the camp, I advanced with Mr. Moore and Dugel to ascertain the object of their visit, which we soon found to be evidently hostile, as they came on rapidly all well armed to the number of 60 or 70, the women and children retiring to some rocky ground, while the men advanced lighting the large stacks of drift which were abundant in this part of the river. When within about 40 yards they halted a moment, as we had damped our fire, and they could not exactly make out our position. Mr. Moore was in the act of removing his horse from the front when a fresh fire enabled them to see us, upon which ten or twelve of the leading men shipped their spears. Being still desirous if possible of avoiding a collision I hesitated to fire upon them, but observing a large body of them advancing with the evident intention of attacking Mr. Roe and his little party in charge of the camp, I advanced a few steps and fired a charge of small shot at the leading men as they were in the act of throwing at us: the effect was instantaneous and

most salutary, as they fled with some precipitation, some of them being evidently wounded; we mounted extra guard for the remainder of the night, but they did not again venture to attack us.

9th May.—Being Sunday we only moved a few miles lower down the river for more grass, and again found ourselves in close proximity to the natives; in the course of the day several of them made their appearance at the top of a hill overlooking the camp, but appeared afraid to molest us; they had with them several large white dogs which were evidently of Australian breed.

10th May.—The river took a south-west course, receiving two large tributaries from the south-east, one of 90 and the other of 50 yards in width. The flats were wider and large trees more abundant; the recent floods had, however, been very destructive to the pasture, and removed much of the soil for a considerable distance back from the river. The trap hills here ceased to appear: the last remarkable one lay about 10 miles S.E. of our morning's camp, and had been named Mount Dalgetty. Our evening's bivouac was found to be in latitude $25^{\circ} 14'$, longitude $115^{\circ} 30' E.$ by account, and its elevation 700 feet above the sea.

11th May.—Until noon our course along the river was nearly north-west, sandstones beginning to crop out on the banks, and the country generally was poor and scrubby; from our noon halt to sunset, our course was nearly west; our bivouac being in latitude $25^{\circ} 02'$. The bed of the river had here widened out to 300 yards with an average depth of 30 feet, a small stream running through the sand in the bottom. In addition to the flooded gum, which grows here abundantly, observed in the bed of the river a melaleuca of large size like a paper bark-tree, but having broad leaves resembling the eucalyptus. During the night the natives were very noisy in the vicinity, some of them approaching so close as to startle our horses, keeping us well on the alert; the horses on this, as on several other occasions, appear to have been our principal safeguard against sudden attack.

12th May.—By the time we had commenced loading our horses a large body of natives had collected and approached to reconnoitre our camp; I advanced towards them to keep them in check until the loads were completed. On observing that I came alone, three natives advanced to meet me, throwing three or four spears at me in a friendly way, which I picked up and stuck in the ground by my side; this token at once established a good understanding, and after an interchange of presents they followed us for many miles down the river before quitting us. Towards nightfall several of

our friends of the morning again made their appearance with a number of strange natives, dodging us among the deep muddy ravines, which abound at this part of the river; their manœuvres being equivocal and unsatisfactory we kept well on our guard; they, however, ran off at night, on my facing about on horseback to drive them away.

Our course during the day had been nearly west 22 miles, one large tributary having joined the river from the northward, which was afterwards named the Lyons, in honour of the gallant Admiral of that name; this accession had increased the breadth of the channel to 400 yards. As we drew towards our evening's bivouac, the river entered a gorge formed by the river cutting through the south end of a flat-topped sandstone range of about 1200 feet elevation above the sea, presenting many bold and picturesque outlines and detached summits, terminating in abrupt and almost precipitous faces; to this we gave the name of the Kennedy Range in honour of our present Governor.

To the south, a detached mass of broken sandstone hills gradually falls away in the distance, apparently into a barren scrub similar to those on the banks of the lower Murchison, while to the west lay before us an extensive plain, unbroken by a single object, save a few low ridges of red drift sand, clothed with a stunted scrub of melaleuca and acacia. The bottom of the gorge we found to be 480 feet above the sea.

13th May.—From this morning to noon of the 15th the country passed over was similar to that first described, the sand ridges running north-west and south-east at about a quarter of a mile apart; the river keeping a general course of west-north-west, its channel deepening to 60 feet, and maintaining an average width of 400 yards. Grass was only to be found in small patches along the margin of the river; the accumulated waters of the late inundations, having been confined to one channel, had risen to the height of 48 feet, carrying away many of the largest timber trees, as also much of the soil from the banks, leaving a scene of devastation exceeding anything of the kind I had hitherto witnessed.

A small description of Spanish reed was here first observed to grow on the margin of the pools. Deep muddy creeks, having only short courses, were very numerous, rendering travelling both tedious and intricate.

From noon of the 15th the country gradually opened out to a thinly grassed plain of light alluvial soil, atriplex bushes and acacia, widely scattered, forming almost the entire vegetation; the

ground, with the exception of the bed of the river, being parched and dry, no rain having fallen during the summer to the west of the Lyons River in longitude $115^{\circ} 30'$ E.

16th May.—Being Sunday, we only moved 4 miles lower down the river for better feed, the channel widening out to 600 yards.

17th May.—Early to-day the river began to throw off numerous channels to the north and south, shedding, when in flood, a considerable amount of water over the adjoining plains, clothing the country in the garb of spring, the grass growing luxuriantly along the numerous channels, atriplex and other low bushes generally covering the plain, the lowest levels of which were extensively covered with fields of mud from 1 to 14 inches thick, the deposit of a single inundation, yet scarcely hardened by the summer sun.

At 20 miles we ascended a sandy ridge of about 60 feet in height, from which we had our first view of Shark Bay, Babbage Island, and the mouths of the Gascoyne, now only 4 miles distant.

Behind the ridge upon which we stood, and for many miles to the south-east, the country was still under water from the recent floods, while between us and the sea lay a low flat, on which were many patches of acacia thicket, alternating with open grassy glades, or fields of atriplex and samphire, terminating to the westward in a broad, irregular belt of mangroves, resting on the shallow margin of the bay.

Descending to the flat, we encamped in a rank patch of grass on the bank of the river, about a mile above Babbage Island, the north end of which I found to be in latitude $24^{\circ} 52'$, which is 4 miles north of the position as given by Sir G. Grey.

18th May.—We found no difficulty in crossing the southern mouth on to Babbage Island, the tide being low; it was quite dry at the junction. Having, with Mr. Roe, walked over the greater part of the island, making a rough sketch of its outlines, and completing the requisite observations, while the rest of the party were occupied in an unsuccessful attempt to catch fish, we retraced our steps and crossed the main channel opposite our last night's bivouac, where it is not more than 250 yards wide. Continuing our course north-east for nearly a mile, we crossed several back channels, some trending towards the Kolaina Flat of Sir G. Grey, while others were lost in the deep sandy ravines that extend for some distance to the north of the river.

While on Babbage Island several natives had waded across the northern mouth of the river to meet us, and had returned after a friendly interview, in which they apparently described the recent landing of two boats with Europeans. We now again fell in with

the same natives on the north bank, near a large encampment of women and children; the latter quickly hid themselves on our approach, but the men assumed a threatening attitude, following us for some distance with much clamour. As their numbers quickly augmented, and they appeared determined to commence a fight, we led them out on to an open plain, where, leaving the pack horses in charge of two of the party, four of us suddenly faced about and charged them at a gallop. This harmless manœuvre had the desired effect; several of them having narrowly escaped being trodden under foot by the horses, they were very quickly dispersed, and made no farther attempt to molest us. We encamped this night about 6 miles above Babbage Island.

19th May.—As our object was to explore as far to the northward as circumstances would allow, we left the river on a north-east course, but two hours' ride across an open plain, through which several channels ran to the north-west, brought us to dry barren scrubs, in which it appeared hopeless that we should find either feed or water; we accordingly altered our course to south-east, and made the river again about sundown.

20th to 23rd May was occupied in tracing up the north bank of the river in the hope of finding a tributary coming in from the northward, but, with the exception of one small stream which drains the western face of the Kennedy range, not a single tributary was met with until we arrived at the Lyons River, a distance of more than 90 miles from Babbage Island. The country on the north bank differs but little from that on the south, except that travelling was somewhat easier.

24th May.—Our horses having had a rest, the previous day being Sunday, we made an early start, and by noon halted on the Lyons River a short distance above its confluence with the Gascoyne; its channel here was equal in magnitude and similar in appearance to the main river: a small stream was still flowing through the wide sandy bed, and gradually increased in volume for nearly 80 miles up the river. Three miles to the north of our midday halt Mr. Roe and myself ascended a steep sandstone peak, from which we had a fine view of the Kennedy range, the nearest part of which lay about 6 miles to the west, extending for nearly 30 miles to the northward; the eastern face presents an almost unbroken line of nearly perpendicular sandstone, of probably 500 or 600 feet elevation. To the north a few remarkable peaks served as valuable points to carry on our triangulation, which had been continued almost uninterruptedly from Mount Hope, on the Murchison.

To the east were several ranges of flat-topped hills, filling in the

space between the Lyons and the great southern bend of the Gascoyne, while to the south, with the exception of a few very distant peaks, it appeared, as far as the eye could reach, to be an uniform plain of open but almost grassless scrub.

Having completed our round of angles, we struck south-east to a patch of forest on the banks of the river, which we did not reach until some time after dark.

25th May.—From this point to lat. $23^{\circ} 56'$, the Lyons maintains a general course of N.N.E. The country passed over during to-day had evidently been tolerably grassy, but the floods had been quite as destructive here as on the Gascoyne, the bed of the river and flats for half a mile on each side being mostly choked up or buried under fields of fine white sand, which had been brought down by the inundations. In several places we observed beds of gypsum and fossil shells, with other strong indications of the existence of coal in the vicinity. Bivouac in lat. $24^{\circ} 41' 18''$.

26th May.—A few miles along the river brought us to a gorge in the eastern edge of the sandstones, to the east of which it opened out into extensive plains, in some parts well grassed and in others much washed by the river. Several trap and granite hills were visible at some distance to the northward and eastward. Our bivouac was in lat. $24^{\circ} 31' 05''$, about 3 miles south of a bold trap range, the summit of which was named Mount Sandiman.

27th May.—The country still maintained its variable character, travelling near the river being exceedingly heavy on account of the sand. The morning had been calm and sultry, but towards noon a strong breeze set in from the north, bringing with it a dense cloud of fine red dust, against which it was no easy matter to make head with our horses. Towards evening the flats began to improve, and we halted for the night among fine grass; melons and tobacco also growing very luxuriantly. To-night it rained for about two hours, clearing the atmosphere of its load of dust.

28th May.—Resuming our course up the river, at 4 miles we crossed a stream-bed 40 yards wide, coming in from the N.N.W., and in the course of the day passed over several thin beds of opaque white lava resting upon the sandstone. At our camp, which was in lat. $24^{\circ} 3' 08''$, granite began to make its appearance in the bed of the river.

29th May.—Our packhorses having now been much lightened of their loads, we were to-day, for the first time, able to trot for several hours, and as the country still improved, several fine grassy valleys coming in from the eastward, we made considerable progress.

At our noon halt, Mr. Moore and myself ascended a hill of red

schist, of 300 or 400 feet elevation, in lat. $23^{\circ} 57' 15''$, which had been named Mount Thomson. From this hill we had an extensive view of the surrounding country; close to the northern foot the river divided into two nearly equal parts; one, coming from the N.N.E., we named the Alma. To the north, just resting on the edge of the tropic, lay a compact range, through which there was apparently but one break, and that was on the line of the Alma; from the southern face of this range, which extends nearly 40 miles to the eastward, numerous streams take their rise and flow southward into the Lyons, which had altered its course and was now coming from the E.S.E. Our intention had been to keep our course until we had touched upon the tropic, but, as the Alma was not running, we decided upon following the main course of the stream, and accordingly adopted an easterly course for the remainder of the day, encamping about 6 miles to the east of Mount Thomson. The river here was much narrower, with a rocky bed containing many pools of permanent character, overshadowed by flooded gums of large growth, much resembling the *Eucalyptus piperita* of the flats of the Swan, but not possessing the same pungent leaf.

30th May.—Sunday. Found our latitude to be $23^{\circ} 58' 32''$, and long. 116° E., by account.

31st May.—We started off at a quick pace, clearing 16 miles by noon, over some fine open grassy flats, timbered for nearly a mile from the river; one tributary 100 yards wide having joined from the north and a smaller one from the south. Leaving the party busily occupied catching fish, which were abundant in this part of the river and much resembling those found in the Murchison, but much larger, some of them being upwards of a pound in weight, I walked with Mr. Nairne to the summit of a granite hill 2 miles to the northward, from which I had a number of cross-bearings to hills already observed from Mount Thomson. One of considerable elevation, bearing N. $121^{\circ} 30'$ E., distance 50 miles, lay directly up the valley of the river, and was named Mount Augustus, after my brother, now conducting the expedition in quest of the remains of Dr. Leichhardt. Pushing on 12 miles farther, we halted for the night in lat. $23^{\circ} 59' 39''$. Tobacco here grew of sufficient size for manufacture, occupying many hundred acres of the best land; a plant much resembling stramonium was also abundant on the moist land, yielding a strongly offensive odour from its leaves.

1st June.—For the first 12 miles along the river the flats much improved, and were only occasionally broken up by stony ridges; good country was seen to extend up the tributaries, several of which came in from the north. To the south, at 2 or 3 miles distant, and run-

ning parallel with the river for many miles, was an even grassy range of moderate elevation, nearly destitute of trees or bushes: the acacia and melaleuca, which had hitherto generally covered the plains, were evidently fast giving way to an open, undulating, and thinly-grassed country, the back lands being, however, still too stony to yield much pasture, the summer grass being already parched and dry, the flats alone continuing moist and verdant.

At our noon halt the main river had ceased to flow, but a tributary coming from the N.E. had a small stream still running in the bottom of a muddy channel, down which the recent floods had brought flags and portions of bulrush, the only instance throughout the district in which we had observed them.

The next 10 miles passed over between this and sunset was chiefly an alluvial flat, much resembling the fertile lands near the mouth of the Greenough: the acacias and several varieties of melaleuca, among which was the *Callistemon phœniceus*, with its beautiful scarlet flowers, were growing with tropical luxuriance, the soil in many places being still saturated with moisture. A water melon was here first observed, the fruit not attaining to more than two inches in length, but not otherwise differing from the cultivated kinds. We also found a fruit in shape like a pear, three inches in length, growing on a small creeper; the interior of the fruit consisted of a number of small flat seeds, to which were attached a bundle of long silky fibres resembling cotton. Our bivouac was in lat. $24^{\circ} 7' 52''$, near a fine pool of fresh water, with limestone cropping out in a thin bed on the banks; we had frequently met with it distributed in small nodules scattered over a large portion of the country on the Upper Murchison.

Since quitting the mouth of the Gascoyne we had seen natives almost daily; to-night we again found ourselves in close proximity to a large encampment of them.

2nd June.—Our neighbours paid us an early visit this morning, some of them evidently bent on mischief, but were restrained by others more prudent, not, however, before it had nearly cost one of them his life; having pointed a spear at Mr. Moore, Dugel, whose natural instincts are very destructive, hastily took aim at him, but fortunately pulled the wrong trigger, which just gave his adversary time to lower his weapon. On our mounting our horses they hastily fell back and joined their other companions at their camp, which was just in our line of march; about thirty of them awaited our approach with some tokens of defiance, but most of them decamped on our coming within spear's throw.

Directing our course for Mount Augustus, we pushed on at a

rapid pace, with the object of ascending it, if possible, before sun-down, but, after riding 20 miles, we found it to be farther off than we anticipated, and accordingly altered our course and encamped at a pool in the river about 3 miles N.E. of the Mount, in lat. $24^{\circ} 20'$, and at an elevation of 1500 feet above the sea.

We here met with strong evidences of the cannibalism of the natives; at a recently occupied encampment we found several of the bones of a full-grown native that had been cooked, the teeth marks on the edges of a blade-bone bearing conclusive evidence as to the purpose to which it had been applied; some of the ribs were lying by the huts with a portion of the meat still on them.

Nearly the whole of the country passed over this day was an alluvial flat, extending on the south-west to the grassy range already described, while to the north and east it extended for many miles, branching out into the numerous valleys that drain the different ranges in that direction; the grass and vegetation on these flats are not so rank as on that traversed the previous day, but more even, and the soil better adapted for agriculture; the amount of good land on this part of the Lyons River was estimated at 150 square miles, while on the tributaries between Mount Thomson and Mount Augustus I have no doubt that there is as much more. Water at this time was plentiful in the numerous channels that intersect the plain, their permanency being the only matter of doubt: our limited acquaintance with the nature of the seasons in these latitudes does not enable us to decide with any degree of certainty; the pools lower down the river are unquestionably of a permanent character, but many of them were already becoming brackish.

The quantity of game seen in this part of the country was also a favourable indication. Turkeys, and a new variety of pigeon having a brown back and slate-coloured breast, on the wing resembling a tame pigeon, congregate in flights sometimes of a thousand together; emeu, cockatoos, quail, and paroquets are also very numerous, particularly the latter.

3rd June.—A gentle ascent of $2\frac{1}{2}$ miles brought us to the foot of Mount Augustus, where, leaving our horses in charge of Fairburn and Dugel, we commenced the ascent up the only accessible point on this side of the hill; it required two hours' heavy toil to bring us to the summit, the barometer gradually falling until it only registered 26.10, which, compared with the simultaneous observations kept at Champion Bay by Mr. H. Gray, gives an elevation of 3,480 feet above the level of the sea, the last 500 feet of the summit being clothed in thickets of melaleuca, among which grew a non-descript variety of red gum-tree, the only new thing observed in

this locality. The air was fortunately very clear, enabling us to take bearings to almost every remarkable summit within 80 miles, and in two instances to hills more than 100 miles distant.

From this commanding position I was enabled to sketch in the courses of the rivers for more than 20 miles, some of them probably taking their rise from 60 to 100 miles still farther to the eastward. To the N.E. the country continued to improve in appearance until the view was intercepted by bold ranges of trap and granite, one of which, bearing N. 30° E. magnetic, distant nearly 100 miles, having a sharp volcanic outline, reared its summit above all the rest. To the S.E. the country was not quite so promising, the ridges presenting naked stony outlines, upon which was only a little scanty grass or a few bushes; to the south it was almost an uninterrupted plain, extending almost as far as the Murchison River, over which lay our homeward course. Descending the Mount, we encamped at a spring, in some fine feed, close at its foot.

4th June.—As we had now been out fifty-one days, and as our provisions were only calculated to last twenty-four days longer, although we had reduced our allowance shortly after quitting the Geraldine Mine, we were reluctantly compelled to turn our steps homeward, as we were still 360 miles from the settled districts. Passing, therefore, over the eastern foot of Mount Augustus, we pursued a S.S.E. course for 20 miles, over alternating grassy plains and stony ridges; we encamped on a river with a sandy bed, in which were a few shallow pools, its trend bearing N.N.W., and probably joins the Gascoyne near the Lockier Range. The feed on this river, as well as on those between this and the Murchison, was principally kangaroo grass of strong growth; the course of the stream being easily traceable from a distance by the flooded gum-trees that invariably lined their margins.

5th June.—A south course of 10 miles over a poor stony country brought us to the head of a stream, which following in the same direction to lat. $24^{\circ} 51' 52''$, we found plenty of grass on its banks and pools of water in its bed, which was here 30 yards wide; the principal features of the adjacent country being low granite ridges, intersected by occasional quartz dykes, alternating with chlorite schist.

6th June.—Sunday.

7th June.—Following a S.S.E. course, at 6 miles the stream turned to the S.W. Passing over several miles of stony country, in lat. $24^{\circ} 59' 32''$, we crossed another stream-bed, 40 yards wide, running to the westward, and forming a junction with the last at some miles distant. Towards sundown we came upon a recently inundated

plain, and a mile farther struck a grassy channel 30 yards wide, which had barely ceased running, the soil for some distance on either bank being a strong red loam, yielding a fair supply of pasture. This channel we afterwards found to be only one of several which formed the main branch of the Gascoyne. The observed latitude was $25^{\circ} 6' 30''$, and elevation 1740 feet above the sea.

8th June.—A mile farther we came upon the main channel of the river, with a wide shallow bed, down which a small stream was still running: the flats were well grassed, and the flooded gums growing for more than a mile back from the river. To the eastward the country continued level and grassy as far as the eye could reach; our time was, however, too limited to admit of our making any further examination of this promising tract. A party of 20 or 30 natives were encamped here, and were apparently living upon the roots of the convolvulus, which grows in the vicinity in great abundance.

For 15 miles to the south-east it continued a level plain of red loam, tolerably well grassed and covered with an open wood of acacia; the next 8 miles was over a poor, stony ridge of moderate elevation, terminating at a large dry stream bed, in latitude $25^{\circ} 24' 16''$, with some fine kangaroo grass on its banks.

9th June.—Ten miles south, over a granite country, we struck the head of a water-course, which, after winding about for 16 miles, ran close to the western foot of Mount Gould, where we encamped at its junction with another small stream coming from the northward. The country passed over to-day was generally very stony, until we came within a few miles of Mount Gould.

10th June.—Taking our course direct for Mount Hale, the pasture rapidly improved; at 10 miles the water-course we had been following formed a junction with the main Murchison coming in from the eastward. From the appearance of the river at this point, it is probable that it takes its rise nearly another 100 miles farther to the N.E. The next 13 miles down the river was fair average cattle pasture, extending for several miles to the right and left—open flats of atriplex and samphire occurring at intervals.

11th June.—The river soon divided into several channels, shedding its waters over a fine alluvial flat of considerable extent, yielding a rich sward of grass, under flooded gums of large growth. A little after noon we came upon our outward track, and encamped at night near the north-west bend of the Murchison.

12th to 22nd June was occupied in descending the river to the Geraldine Mine, cutting off several bends of the river, and making

such additions to our sketch of the outward route as circumstances would admit.

23rd June.—We all arrived safe at the hospitable residence of Mr. W. Burges, just in time to escape a set in of rain, which lasted, with little intermission, till the 26th.

27th and 28th June were employed in packing up and otherwise disposing of the equipment of the expedition. On the 29th we arrived at the house of Mr. L. Burges, on the Irwin; the following day being occupied in making up the accounts connected with the expedition, which, including the whole of the cash expenditure, did not exceed 40%, which sum had already been subscribed by a few settlers interested in the undertaking.

Quitting the Irwin on the 1st of July, and proceeding by way of Dandaragan and Toodyay, I arrived with Mr. Roe and chainer Fairburn in Perth on the 10th instant, having accomplished a journey of nearly 2000 miles in 107 days.

On reviewing the foregoing report, I find it necessary to add a few observations on subjects that could not well be introduced into the body of the narrative.

In the first place, viewing the geographical and geological features in combination, the tract of country contained within the 114th and 118th parallels of longitude, and the 24th and 27th degrees of south latitude, may be considered as an inclined plain, the eastern edge of which has an elevation of about 1700 feet above the level of the sea. Commencing from the coast, the first 100 miles is almost exclusively of tertiary sandstone formation, which the process of denudation has, in many instances, converted into either stony or sandy tracts, rarely fertile, except when subject to the influence of frequent inundation. This region seldom gives rise to rivers or watercourses; the flat-topped ranges which are often found towards the eastern limits of this formation do not generally exceed 500 or 600 feet in altitude, and are only those portions of country that have not as yet yielded to the waste of time or the constant action of rivers, which, rising in the higher lands more to the eastward, rapidly abrade, and in their onward course remove the soft and porous sandstone from their bases.

In the deeper valleys, towards the eastern edge of these sandstones, thin beds of oolitic limestone, containing numerous fossil shells, occasionally occur; also gypsum and clayey shales, with other indications of the probable existence of coal in the vicinity: following the series appears a compact, fine-grained amorphous sandstone, having an almost flinty fracture; this rock in a few miles gives place

to granite and gneiss, frequently broken up by the upheaval of whinstone and porphyritic trap hills, having an elevation of from 100 to 500 feet above the plain.

As we proceeded eastward, the eruptive rocks became more numerous; chlorite slate, veins of quartz, chert, and variegated jasper, frequently forming the summits of the most elevated hills, while, on the general level of the plain, are occasionally found thin beds of ancient lava.

The rivers, unlike most others in Western Australia, have nearly an even fall throughout their entire length, amounting on an average to 6 feet per mile: this, in a country subject to the sudden fall of almost tropical rains, is what gives rise to the destructive inundations already described.

Of the climate and seasons, so little is at present known, that, allowing all other difficulties to have been overcome, it would be very hazardous to risk flocks and herds beyond the head of the Murchison, until the country has again been visited at a different period of the year, as it is probable that it has as yet only been seen under the most favourable conditions.

The fluctuations of the temperature are occasionally considerable: in the middle of June it some days amounted to 46° in six hours, registering at 7 A.M. 36° , and at 1 P.M. 82° ; ice having been seen as far north as lat. $24^{\circ} 30'$.

The prevailing winds during the period of inundation appear to have been from the south-east, as most of the trees blown down while the soil was in a state of saturation, lay with their tops to the north-west. In May and June the winds ranged between north-east and south-east.

Of the regularity of the return of the summer rains it is at present difficult to form a decided opinion; but as far as observation would admit, I am inclined to think they cannot be relied on with any degree of certainty to the southward of the 25th degree of lat., the period at which they fall being about January and February; and it is a significant fact that the grass found buried beneath the mud during these months, had generally attained only about half its growth.

With regard to the quantity and distribution of the available lands, it will only be necessary to observe that, with the exception of 30,000 or 40,000 acres at the mouth of the Gascoyne, there is no land worth occupying for many years to come to the west of the Lyons River. The amount of land on this river has already been estimated at nearly 300 square miles, while on the Upper Gascoyne and its tributaries there is, probably, double that quantity: this, with

the lands on the Murchison, near Mount Hale, would make a total of about a million of acres.

A very important circumstance in connection with this district is the total absence, so far as we were able to observe, of any of the varieties of *Gastrolobium* or *Euphorbia*, which constitute the poisonous plants so fatal to cattle and sheep in other parts of the colony.

The means of access to the Upper Gascoyne and Lyons is another important matter for consideration. I am inclined to think that these districts cannot be advantageously settled until the tract of country between it and the north coast has been explored, and a port established somewhere between Exmouth Gulf and Depuch Island, as, should the country in that direction fulfil its promise, the intervening space would very quickly be filled up and the lands on the Gascoyne become available, its distance from the north coast being about 200 miles, while from Port Gregory or Champion Bay would not be less than from 340 to 360 miles; a difference of some moment in the transport of stores or produce.

From the lay of the country to the northward of the Lyons River there does not appear to be any reason to suppose that a river of any magnitude falls into Exmouth Gulf, as there would be hardly room for it between the sources of the Alma and the rivers flowing to the north coast.

I cannot bring my Report to a conclusion without recording my acknowledgments to Mr. James Roe for the able and efficient assistance he has rendered me throughout the expedition, barometrical observations and management of the provision department having been especially under his charge.

My best thanks are also due to Mr. W. Moore and Mr. C. Nairne, who on every occasion endeavoured to relieve me as much as possible from some of the many arduous duties that necessarily devolve on the leader of an exploring party. Chainer Fairburn and the Native Dugel also gave general satisfaction in the performance of their respective duties.

I may add that to the ready co-operation and unanimity that prevailed throughout the party may, in no small degree, be ascribed the successful issue of the undertaking.

I have the honour to be, Sir, &c.,

F. T. GREGORY, Assistant-Surveyor.

To the Hon. the Surveyor-General, &c.

The PRESIDENT.—I feel personally obliged to Mr. F. Gregory for having brought the Murchison River into fashion. When my friend Sir George Grey, the present governor of the Cape of Good Hope, went to explore this country

many years ago, I was enabled to be of some little use to him, and in gratitude he named after me one of the rivers that he discovered. It was supposed that this river would turn out only a poor stream through a barren saline country; but I am glad to hear that it is so productive. Moreover, I find they have named two of its affluents the "Roderick" and the "Impey." To pass from that part of the subject, I consider the paper one of great value. Western Australia is rapidly extending into importance. We have long wished to know whether a large and rich tract of country might not be colonised to the north. Mr. Gregory has assured us that such tracts do exist, and has also shown that there are copper-mines, iron, and other ore in great abundance. Mr. F. Gregory is one of the three younger brothers of our Medallist, and they are all good geographical explorers.

MR. J. G. AUSTIN.—I have been a resident in Western Australia from thirteen to fourteen years, and I have had a personal acquaintance with the family of Mr. Gregory, and can speak to their energy and competency, and to the credit which their statements deserve. Some three or four years ago the tribes who communicate one with another in a chain down to Swan River, gave us to understand that birds mentioned by Mr. Gregory came from a good country. Consequently an exploration was formed for the purpose of discovering whether it was so or not. The discovery by Mr. Gregory of this bird, which had not been seen on the Swan River, except in 1854, during the last twenty years, proves, in my opinion, that there is a great extent of good land in the neighbourhood in which it was found by Mr. Gregory. It is apprehended that the great distance at which the land is situated from head quarters will for a time prevent the colonists from taking advantage of it; and a report is current that to the east and north-east (at about 250 to 300 miles east of the Swan River) there is an impenetrable belt of under-wood, which the natives say is forty miles through, and impossible to be penetrated, and which presents an insuperable barrier to further exploration of the interior of the great continent of Australia from the western coast.

MR. J. CRAWFURD, F.R.G.S.—I wish to say a few words upon those productions which are said to characterise the river Murchison—a very good name, and I wish the river were worthy of it—the wild tobacco, the musk-melon, and the water-melon. As to the wild tobacco, I believe that to be perfectly correct, and say so on the authority of my late excellent friend Robert Brown. But he assured me it was of no value as a production. The land watered by the Murchison is the first part of Australia in which I have heard of anything like an esculent tuber resembling that of the *Convolvulus batata*—the potato. Will any botanist present assure us that this is the true batata? because if it were so, or indeed any esculent tuber, the natives in this part of Australia ought, cultivating it and feeding on it, to have been found in a higher state of civilisation than any Australians have yet attained. With respect to the musk and water-melon, Mr. Gregory must have mistaken something else for them, because they are really the productions of certain parts of Asia. I am glad to hear of this fertile territory of the river Murchison. It will no doubt be quite favourable for the production of wool, and a very different country for the sheep from the hot tropical region of Australia to which some gentlemen have been proposing to push their runs.
